1. Determine if each statement below is always true or sometimes false.

   (a) $\int f(x)g(x)dx = \int f(x)dx \int g(x)dx$.

   (b) To evaluate $\int \sin^{-1}(x)dx$ by part, choose $u = \sin^{-1}(x)$ and $dv = dx$.

   (c) To evaluate $\int x\ln(x)dx$ by part, choose $u = x$ and $dv = \ln(x)dx$.

   (d) To evaluate $\int \cot(x)dx$, integrate by substitution choosing $u = \sin(x)$.

2. evaluate the integrals.

   (a) $\int x^2 e^{x^3}$.

   (b) $\int x^3 e^{x^2} dx$.

   (c) $\int 4^{-x} dx$.

   (d) $\int x^2 4^x dx$.

3. Determine if each integral below can be evaluated using a method we have learned so far (formula, u-substitution, integration by parts, or trig identities). If so, evaluate the integral. If not, explain why it cannot be evaluated.

   (a) $\int x^5 \ln(x)dx$.

   (b) $\int \sin^5(2x)\cos^3(2x)dx$.

   (c) $\int \cos^3(2x)dx$.

   (d) $\int \tan(x)\ln(\cos(x))dx$.